

15.

Eastern Pacific Expeditions
of the New York Zoological Society, XV.
Seven New Marine Fishes from Lower California.¹

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(Plates I-III; Text-figures 1-5).

[This is the fifteenth of a series of papers dealing with the collections of the Eastern Pacific Expeditions of the New York Zoological Society made under the direction of William Beebe. For data on dredges, localities, dates, etc., concerning the capture of specimens treated in this paper, refer to *Zoologica*, XXII, No. 2, pp. 33-46.]

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MOBULIDAE.

***Mobula lucasana*, sp. nov.**

(Plate I, Figs. 1 & 2; Plate II, Figs. 3 & 4; Plate III, Fig. 5).

Type: Holotype ♀; No. 24,793, Department of Tropical Research, New York Zoological Society; San Lucas Bay, Lower California, Mexico; March 30, 1936; width across disk 1,035 mm. (40¾ inches); length from anterior part of disk to posterior margin of the pelvic fins, 584 mm. (23 inches). Type in the collections of the Department of Tropical Research, the head, posterior body and tail preserved, the latter damaged, only a length of 7 inches projecting beyond the outer margin of the pelvic fins.

¹ Contribution No. 561, Department of Tropical Research, New York Zoological Society.

Description and Dimensions of Type: Skin smooth, no trace of rugosities or spines anywhere. Width across disk 1,035 mm.; length from anterior margin of disk to posterior margin of the pelvic fin 584 mm. (anterior margin of the disk considered as being at the mid-line of the body, thus not including the cephalic projections); cephalic fins extending forward 80 mm. beyond the anterior margin of the disk, the distance between their tips approximately 150 mm., distance from upper margin of the cephalic fin to lower margin of the fin when the fin is unfurled, 58 mm. Eye lateral, 17 mm. in diameter, its anterior margin 88 mm. from the tip of the cephalic fin. Spiracle oblique, 31 mm. posterior to the eye. Mouth inferior, 128 mm. wide, very slightly concave when viewed from below, the margin of the upper lip 40 mm. from the anterior margin of the disk.

Teeth in each jaw in a narrow band, each band extending 70 percent of the width of the mouth. Upper jaw with 80 transverse rows of teeth and 5 rows from back to front. Lower jaw with 97 teeth in a transverse series and with 4 or 5 rows from back to front. Teeth small, flattened, their surfaces slightly roughened, the posterior border with 2 to 5 dull, irregular points. A typical tooth in the center of the lower jaw measures 1.2 mm. in width and .5 to .6 mm. in depth.

Mouth to transverse line of first gill-openings 70 mm.; transverse distance between first gill-openings 133 mm.; transverse distance between last gill-openings 60 mm.; length of gill-slits of first four pairs of gill-openings 52 mm.; length of last gill-slit 37 mm.

Pelvic fins rather elongate, their tips extending 31 mm. beyond the posterior tip of the pectoral, the inner margin extending backward farther than the outer, the fin nearly uniform in width, averaging 38 mm.

Dorsal fin with its posterior one-fourth situated above the free portion of the tail, the base of the fin 57 mm., the height 46 mm.

Tail immediately beyond the dorsal fin flattened, the skin of its upper surface reticulated, the reticulations being in the form of minute, low, raised ridges of skin, the upper margins of which are roughened and occasionally slightly ciliate. Although the area mentioned above has this peculiar specialized skin there is no trace of a spine or of the beginnings of a spine. Tail beyond the expanded portion becoming attenuated near the tips of the pelvic fins, its diameter 50 mm. posterior to the tips of the pelvic fins being 3.5 to 4 mm.

Color: In life upper surfaces, including the area about the eye and the upper part of the cephalic fins, blackish-gray; lower surfaces whitish becoming bluish-gray toward the tips of the wings, this color darkest on the anterior portion of the fins. Leading edge of undersurfaces of pectoral fin dusky, the posterior edges similarly colored but the band of color narrower. An oval, dusky spot near the posterior margin of the lower side of the pectoral fin, slightly nearer the pelvic fins than the tip of the pectoral. Tip of the cephalic fin black.

The preserved type has the underside of the body, anterior to the mouth, and a narrow band along the lower jaw as well as the entire inner surface of the cephalic fin, brownish-black.

Remarks: Two species of *Mobula* are recorded from the eastern Pacific, *Mobula tarapacana* (Philippi) from the coast of Chile and *M. japonica*, recorded from Hawaii and known principally from the western Pacific.

Mobula tarapacana was described from a drawing of a dead specimen and there is considerable question as to the accuracy of the description and figure. The present species, *M. lucasana*, however, does not possess the peculiar long neck of the drawing of *tarapacana*.

In all of the available descriptions of *M. japonica* the bands of teeth are described as extending to, or nearly to, the angles of the jaws. The teeth of the present species by no means extend that far. In addition

japanica possesses a caudal spine and, even though the caudal of *lucasana* is damaged, there is sufficient to show that the spine is lacking. Jordan and Fowler's figure (*Proc. U. S. National Museum*, XXVI, p. 666, fig. 10) of a fetus of *japanica* shows quite clearly a spine on the tail close to the pelvic fins, a condition that is not true of *lucasana*. However, in the present species it is of interest that the skin of the upper portion of the base of the tail is modified, a condition that may or may not be significant in view of the absence of a spine. This modification is mentioned in the description of the species.

During the 1936 *Zaca* Expedition these fish were common at Cape San Lucas and San Lucas Bay and a number of individuals were seen somersaulting in the air and striking the water in descent with a sound audible for considerable distances. In January and February, 1938, numerous individuals, presumably of this species, were seen off Elena Point and Cape Velas, Costa Rica. Probably some of the west coast of Central America sight records of *Manta* can be assigned to the present new species.

The type of *lucasana* was captured on a baited hook.

MYRIDAE.

Arenichthys, gen. nov.

Body elongate; dorsal fin beginning close behind gill-opening; pectoral fins absent; anterior nostril in a tube; posterior nostril in a flap-like tube which is open on its inner posterior aspect, the tube as large and conspicuous externally as the anterior nostril; teeth as in the description of the species.

Genotype: *Arenichthys apterus* Beebe and Tee-Van.

Arenichthys apterus, sp. nov.

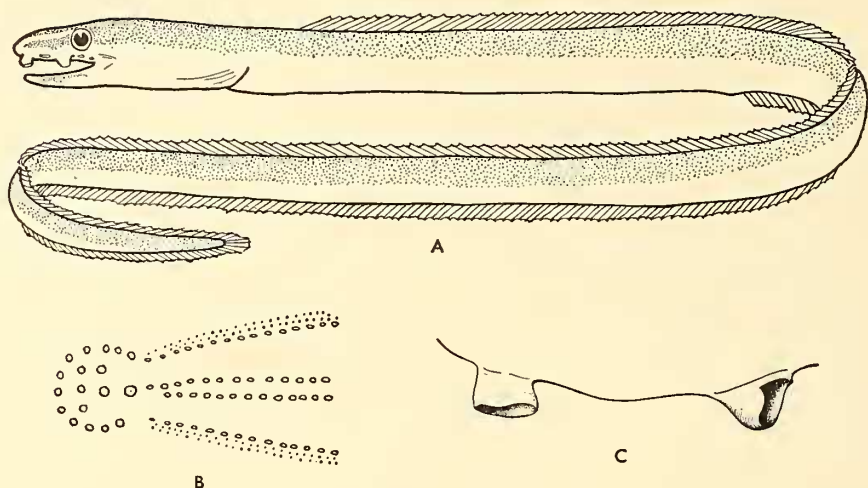
(Text-fig. 1a, 1b, 1c).

Type: Holotype, No. 25,361, Department of Tropical Research, New York Zoological Society; taken in dredge 136-D-16 in 45 fathoms, Arena Bank, Lower California (23°29'30" N., 109°25'30" W.), April 20, 1936; standard length 135 mm. Type in the collections of the Department of Tropical Research.

Measurements of the type: Length, standard, 135 mm.; depth 4.1 mm. (33); head 16.6 mm. (8.1); eye 1.6 mm. (10.2); snout 3.6 mm. (4.6); snout to gape 5.8 mm. (2.85); snout to dorsal fin 19 mm. (7.1); snout to anus 46 mm. (2.95); snout to anal fin 47.5 (2.84).

Description: Body elongate, worm-like, very slightly compressed, the depth 33 times in the length; head and trunk 2.95 in the length. Head 8.1 in the length, 1.76 in the trunk; gill opening oblique, at the level of the mid-sides. Gape extending backward slightly beyond the vertical of the posterior border of the orbit.

Maxillary teeth small, conical, in three rows, the teeth of the inner row considerably larger than the others; all are slightly depressible. Vomer anteriorly with a series of teeth about its border; progressing backward from these border teeth are three teeth set transversely on the median line followed by two teeth set on the median line; posterior to these are two lines of teeth on the shaft of the vomer, the two rows rather widely separated from each other, the teeth of the central portion of each row slightly heavier than those of the anterior and posterior portions. Lower jaw with a double row of small conical teeth becoming an irregular three rows anteriorly, the teeth of the inner row largest.



Text-figure 1.

- A. *Arenichthys apterus*. B. *Arenichthys apterus*. Diagram of teeth of the upper jaw. C. *Arenichthys apterus*. View from inside of mouth of right side of upper lip, showing (left) the tubular anterior nostril, and (right) the posterior nostril.

Anterior nostril in a tube; posterior nostril in a flap-like tube which is open on its inner posterior aspect. Eye small, 10.2 in the head.

Dorsal fin beginning slightly less than an eye's diameter posterior to the vertical of the gill opening, confluent with the anal fin about the tip of the caudal. Pectoral fins absent.

Color: Brown above, white below, the boundary sharply demarcated, especially on the head. Here the brown of the interorbital space extends forward to the snout as a band the width of the interorbital space, leaving the upper lip and the side of the head white with the exception of a rather long, triangular, brown spot extending forward from the eye toward the snout. Lower jaw with a narrow brown band along the lip, most intense interiorly, and hidden by the upper jaw when the mouth is closed.

BOTHIDAE.

***Citharichthys gordae*, sp. nov.**

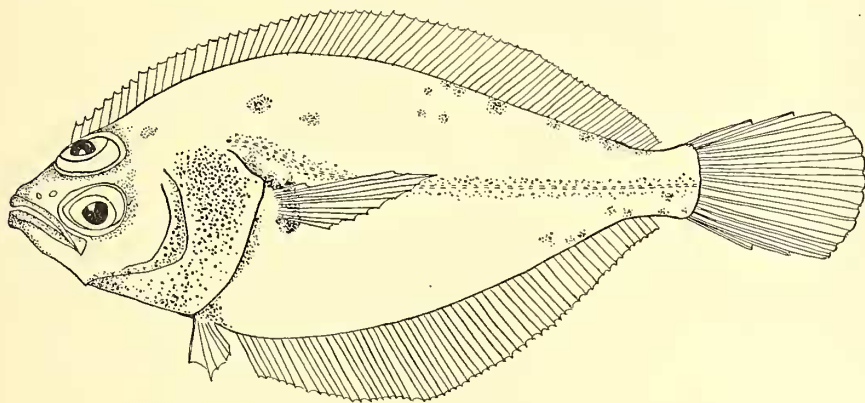
(Text-fig. 2).

Type: Holotype, No. 25,785, Department of Tropical Research, New York Zoological Society; taken at Station 150, Dredge Haul 14; depth 60 fathoms, center of outer Gorda Bank, Lower California, April 23, 1936; standard length 97 mm. Type in the collections of the Department of Tropical Research.

Dimensions of Type: Total length 120 mm.; standard length 97 mm.; depth 40 mm. (2.4 in length); head 36 mm. (2.7 in length); eye 10.5 mm. (3.7 in head); interorbital space 1.3 mm. (8 in eye); maxillary 12 mm. (3 in head); pectoral length 22.5 mm. (1.6 in head).

Counts of Type: Dorsal fin 76; anal 57; pectoral 12; gill-rakers 19; lateral line scales 50; vertebrae 33.

Description: A medium-sized flounder (standard length up to 111 mm.), moderately deep (2.4 in length); eyes separated by a narrow, concave, scaled space which rises to a sharp ridge above lower eye; interorbital width similar in both sexes; dorsal beginning on blind side opposite front of eye; upper pelvic fin on ventral profile; head moderately compressed with the upper profile very slightly concave; anterior margin of the eyes are level or the lower slightly in advance; upper eye touching profile of head; maxillary not reaching middle of eye; teeth slightly enlarged anteriorly but not forming real canines; indications of an imperfect second row in the upper jaw; gill-rakers long and slender; scales relatively strongly ctenoid.



Text-figure 2.

Citharichthys gordae. Drawing by George Swanson.

Color: Immaculate below; brown above with various dark mottlings, sometimes reduced to several small spots, or increasing to larger blotches, the extreme is where the dark color has run together covering three-fourths of the upper surface. The fins are dusky, sometimes indistinctly mottled or spotted; opercular region and lateral line always dark.

In specimens of 50 mm. standard length or under, there is often a faint but distinct regular pattern. The body is pale with 6 to 8 broken cross bands, very distinct as mid-ray spots on the profile fins, and about as strong but of greater extent on the baseosts; these bands are very irregular on the body proper but in general follow the oblique muscle bands. The prepeduncular band is almost complete and the dark markings on the peduncle are reduced and concentrated to a pair of jet black dots in the profile.

Variation: Considering that 216 specimens of this new form were taken on Gorda Bank, measuring from 31 to 111 mm. in length, the extremes of variation shown were small. Depth in length 2.3 to 2.4 (average 2.3); head in length 2.68 to 2.7 (2.7); eye in head 3.4 to 4.15 (3.75); snout in head 5 to 6 (5.5); maxillary in head 2.78 to 3 (2.9); dorsal count 73 to 79 (76); anal count 57 to 62 (58.7); scales 48 to 50 (48.6); gill rakers 17 to 19 (18).

General Relationships: In general appearance and the more obvious external characters *C. gordae* approaches *C. fragilis*, a species which has been taken only in the upper half of the Gulf of California, from Guaymas northward. On the other hand the low vertebral count of *gordae* (34) removes it, according to Norman, from the subgenus *Orthopsetta* "species of the North Pacific," (with 37 to 40 vertebrae, including *sordidus*, *fragilis*,

xanthostigma and *stigmaeus*), and places it in the subgenus *Citharichthys* "species of the Atlantic and Tropical Pacific," (with 33 to 36 vertebrae), including the Pacific species *platophrys* and *gilberti*. In scale and gill-raker count and interorbital width it is indistinguishable from *fragilis*, while in dorsal and anal ray count it departs widely from this species and is within the range of both species of subgenus *Citharichthys*. In depth and pectoral length it is closest to *stigmaeus*. *C. gordae* differs from the two species *platophrys* and *gilberti*, in possessing smaller scales, a greater number of gill-rakers, a larger head, shorter maxillary and a much narrower interorbital. The distinctions between the two subgenera *Citharichthys* and *Orthopsetta* are very slight and may disappear on more intensive study.

Local Distribution: Two hundred and sixteen specimens of this new species were taken by us, 200 of which came up in ten dredge hauls at Station 150, on Gorda Banks. The single catch of these fish outside of the banks but in the same general locality was from Station 151 D-1, when 16 came up from a depth of 60 fathoms on April 24, half a mile south of Cape San Lucas and 20 miles south-west of Gorda Banks.

The ten catches on Gorda were made on April 21, 22 and 23, 1936. The extremes in vertical limits were 45 to 80 fathoms, in size 31 to 111 mm. and in abundance in hauls were 2 in D-6 and 50 in D-4. The ten hauls show a remarkable relation to sandy bottoms, none being on muddy or rocky areas.

The 16 flounders taken at Station 151 measure from 31 to 111 mm. in length, an average far and away smaller than those from Gorda, and this may have significance in the proximity of the locality to San Lucas Bay which proved, in the case of many other fish, to be a nursery for young stages.

SCORPAENIDAE.

Scorpaenodes cortezi, sp. nov.

(Text-fig. 3).

Type: Holotype, No. 24,889-A, Department of Tropical Research, New York Zoological Society. Taken at surface in weed, Station 138, 24° 55' N. Lat., 110° 20' W. Long., 10 miles east of San Jose Island, Gulf of California, April 8, 1936. Standard length 45.5 mm. Type in the collections of the Department of Tropical Research.

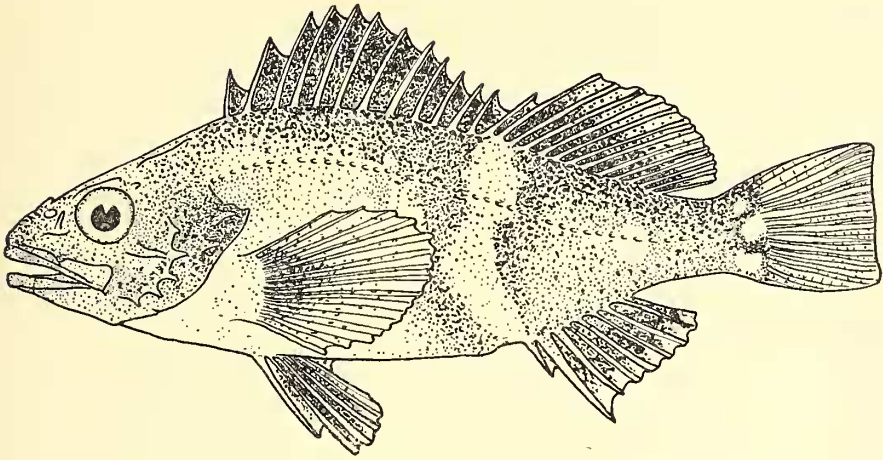
Measurements and Counts of Type: Length, total, 54 mm.; length, standard, 45.5 mm.; depth 16 mm.; width of body 8.8 mm.; head 15.8 mm.; eye 4.2 mm.; snout 5.3 mm.; maxillary 8.2 mm.; interorbital space, 3.2 mm.; snout to dorsal fin 16.1 mm.; snout to anal fin 31 mm.; dorsal fin XIII, 13; anal fin, III, 6; pectoral fin 18; pelvic fin I, 5; scales, approximately 63 rows; lateral line pores 41; gill-rakers 10 plus 20.

Description: Body considerably compressed, its width 5.2 in the length, depth 2.84; the dorsal outline evenly rounded.

Body, with the exception of snout, chin, maxillary, branchiostegal membranes and isthmus, covered with small, weakly ctenoid scales, approximately 63 rows from shoulder to caudal fin.

Lateral line continuous, prominent, following the dorsal outline and composed of 41 pores.

Head 2.86 in the length, about 1½ times as deep as wide. Spines of the head low, the following present: nasal, preocular, supraocular, postocular and parietal. Opercle posteriorly with two flat spines, the upper slightly longer than the lower, the lower heavier at its base. Preopercle with five rather prominent spines, the second and third slightly stronger than the others. Suborbital stay weak but evident without dissection.



Text-figure 3.

Scorpaenodes cortezi. Drawing by George Swanson.

Snout 3 in head. Eye small, 3.75 in the head. Nostrils small, slightly nearer eye than snout, the anterior with a slight raised rim.

Mouth terminal, the jaws equal. Maxillary 1.9 in the head, its posterior tip extending to the vertical of slightly beyond the posterior margin of the pupil. Upper and lower jaw with a band of small conical teeth, the band widening anteriorly. Vomer with small teeth on its head, none on the shaft. Palatine teeth apparently absent in the type specimen, but present as a band of minute teeth in a 39 mm. specimen that has been stained with alizarin and cleared in caustic potash.

Gill-rakers 10 plus 20 on the first arch; rakers slim, the longest about half an eye's diameter. No slit behind the fourth gill-arch.

Spines of the dorsal fin regularly increasing in length from the first to the fifth, the length of the latter being two in the head, the spines then decreasing in length, the last spine about half the height of the first ray. Soft dorsal fin anteriorly about as high as the highest spine, slightly lower posteriorly. First anal spine less than half the height of the second; second anal spine considerably stronger and heavier than the other two; tip of the second extending slightly beyond that of the third. Anal rays slightly longer than the second anal spine. Caudal fin truncate. Pectoral fin rounded posteriorly, all its rays simple, the tips of the rays expanded and flattened, the tips with heavy skin. Tips of the lower three to four rays free of membrane. Pelvic fins inserted posterior to the vertical of the pectoral fin base.

Color: A color sketch made from the living fish is as follows: Body dark reddish-brown with a yellowish tinge, paler below, the entire body covered with black punctulations and irregular greenish-yellow blotches, the latter especially marked posteriorly. Dorsal fin dark brown, the membranes of the spinous dorsal black, the soft dorsal irregularly blotched with lighter. Caudal fin yellowish-green, without pattern. Pectoral fin brownish, yellow toward the tip and dusky at the base. Pelvic fins black at base, yellow at tips and with scarlet along the anterior edge. Anal fin black at base, yellow on outer half and with a small scarlet patch at base of the first spine.

In preservative the body is dark brown with irregular, rather large, lighter blotches.

AMMODYTIDAE.

***Ammodytes lucasanus*, sp. nov.**

Type: Holotype, No. 25,249-A, Department of Tropical Research, New York Zoological Society; from stomach of *Euthynnus alletterata* (Rafinesque), Cape San Lucas, Lower California, April 25, 1936; standard length 100 mm. Paratype: No. 25,541-A, from stomach of *Seriola colburni* Evermann and Marsh, Cape San Lucas, Lower California, May 6, 1936; standard length 103 mm. Types in the collections of the Department of Tropical Research.

Thirty-one other specimens (Nos. 25,249, 25,541 and 25,555), 50 to 106 mm. standard length, are also in the collections. They were taken from the stomachs of the following fish: *Euthynnus alletterata* (Rafinesque), *Seriola dorsalis* (Gill) and *Seriola colburni* Evermann and Marsh, and from a cormorant, *Phalacrocorax penicillata* (Brandt); all of these from Cape San Lucas, April 25, 1936 and May 6, 1936.

Dimensions of Type: Total length 114 mm.; standard length 100 mm.; depth 11.3 mm. (8.85 in length); width of body 8.6 mm. (2.72 in head); head 23.5 mm. (4.25 in length); eye 3.8 mm. (6.2 in head); interorbital space 2.6 mm. (9 in head); snout 6.6 mm. (3.55 in head); maxillary 7.7 mm. (3.04 in head); predorsal length 25 mm. (4 in length); preanal length 66 mm. (1.6 in head); pectoral fin length 10.2 mm. (2.3 in length); caudal peduncle depth 5.1 mm. (4.6 in length).

Counts of Type: Dorsal fin 47; anal fin 22; pectoral fin 15; 97 lateral folds; branchiostegal rays 7; gill-rakers 6 plus 23; vertebrae 56.

Description: Elongate, spindle-shaped, tapering toward head and caudal fin, the head quite sharp and pointed. Upper and lower profiles similar.

Body, with the exception of the head, covered with scales, the scales being cycloid but with traces of small points along the posterior edge, the whole suggesting a weakly ctenoid scale.² A series of 97 oblique folds along the sides, the upper margin of each fold being anterior to the lower. A fold of skin along the lower side of the belly ending near the beginning of the anal fin, this fold not noticeable in the preserved type but remarked upon in the field notes on fresh specimens.

Lateral line single, paralleling the back; anteriorly the lateral line partly surrounds the eye, having an angled branch descending to under the posterior lower edge of the eye, and an upper branch which runs obliquely forward ending posterior to the vertical of the eye; on the posterior head the lateral line follows closely the upper border of the opercular margin, then sharply ascends to the position of the line on the body; a short transverse branch of the lateral line on the nape, not meeting its fellow of the opposite side.

Head conical, 4.25 in the length, the lower jaw projecting considerably beyond the tip of the upper and with a heavy fleshy tab on its tip. Eye 6.2 in head. Nostrils subcircular, the anterior slightly larger, situated midway between the eye and the tip of the premaxillary, placed one before the other and widely spaced from each other. Mouth widely protractile, the jaws, vomer and palate toothless. Maxillary extending slightly beyond the vertical of the anterior border of the eye.

Opercular and preopercular borders smooth, the former ending posteriorly in a wide obtuse flap. Branchiostegal rays 7, the membranes free from each other, leaving a wide opening inferiorly.

Dorsal fin low, continuous, formed of rays only, originating slightly back of the pectoral origin. Caudal fin deeply forked. Anal fin low, con-

² This is also true of specimens of *Ammodytes personatus* from the San Juan Islands, Washington (Amer. Mus. Nat. Hist., 2712).

tinuous, formed of rays only, originating under the 29th dorsal ray. Pectoral fins small, pointed, situated below the median line of the body. Pelvic fins absent.

Color: Fresh specimens greenish above, silvery on sides with traces of bright golden yellow on the sides of the head and upper body. A series of rather widely placed black spots (8 in the holotype, 4 in the paratype) along the upper margin of the dorsal fin.

Variation: In a series of ten specimens examined, including the paratype, there is the following variation in proportions and counts: depth 7.8 to 9.45; head 4 to 4.25; eye 6.8 to 8; snout 3.5 to 3.8; dorsal fin count 45 to 46; anal fin count 20 to 23; lateral folds 97 to 100; gill-rakers 6 plus 22 to 23.

Remarks: During the last few years there has been a tendency to consider many of the northern forms of *Ammodytes* as being a single circumpolar species which sends representatives down the coasts of the continents to a greater or lesser degree, the distance depending upon the temperature of the water and other conditions.

As far as the Pacific is concerned, ichthyologists seem in agreement that all of the previously reported *Ammodytes* in that region are of one species. Thus the nominal form *alascanus* was merged during the latter part of the last century with *personatus*; Jordan in 1906 considered the Japanese form as the same species and in 1930 Soldatov and Lindberg utilized the name *personatus* for the northwestern Pacific fish. Finally Schultz in 1936 has related the Pacific form to the circumpolar species by using the name *Ammodytes tobianus personatus* (Girard) for the Pacific fish.

With this taxonomic history in mind the counts and measurements of two series of eastern Pacific *Ammodytes*, one series from Karluk Island, Alaska, and the second from Straits of Juan de Fuca, Washington, together with the records in the literature of California specimens, have been compared with those of our San Lucas material. The most pertinent counts are included in the following diagram; unfortunately we have not been able to procure California specimens, so that we have no vertebrae counts for this locality.

		A M M O D Y T E S			
		LUCASANUS	P E R S O N A T U S		
		SAN LUCAS	CALIFORNIA	WASHINGTON	ALASKA
DORSAL FIN RAYS	60				
	50				
	40				
ANAL FIN RAYS	35				
	30				
	25				
LATERAL FOLDS	180				
	140				
	100				
VERTEBRAE	75				
	70				
	65				
	60				
	55				

Examination of the table above demonstrates the apparent close relationship of *lucasanus* to the northern *Ammodytes*. In each of the characters shown there is a numerical diminution as one progresses southward, a condition similar to that found in other groups of fishes. In the case of the lateral folds, however, the fishes from California to Alaska are markedly closer to each other than they are to *lucasanus*; this similarity is shown to a lesser degree in the dorsal fin rays.

While it might be advisable to consider *lucasanus* as a southern representative of *personatus*, we think it better, for the present, to establish it as a separate form, principally for the following reasons:

1. A gap of 1,100 miles intervenes between the southernmost recorded locality of *personatus* (Monterey Bay, California) and the type locality of *lucasanus*. Specimens from this gap would help to establish the relationship between the two forms.

2. The San Lucas fish come from a sub-tropical faunal region, as opposed to the cold water habitat of *personatus*. San Lucas is about 420 miles south of Cedros Island where northern and southern faunas meet and cross.

3. With this faunal difference in mind it is possible that the lessened numerical characters may be constantly associated with the warm water habitation of *lucasanus* and that this species may have broken off completely from its northern parent form, leaving no intermediates.

EMBLEMARIIDAE.

Emblemaria micropes, sp. nov.

(Text-fig. 4).

Type: Holotype, ♂, No. 24,895, Department of Tropical Research, New York Zoological Society. Taken in loose weed floating along beach, Inez Point, Santa Inez Bay, Gulf of California, April 9, 1936. Standard length 33 mm. Type in the collections of the Department of Tropical Research.

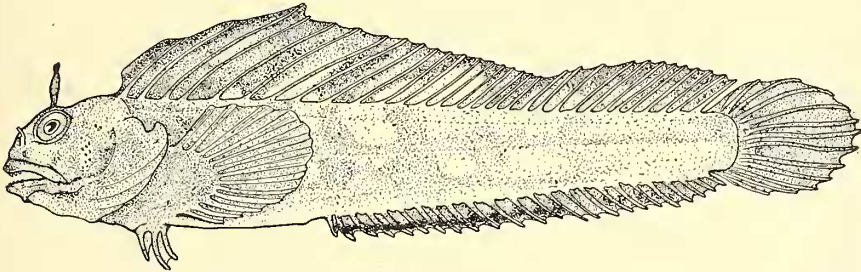
Dimensions and Counts of Type: Length, total, 37.6 mm.; length, standard, 33 mm.; depth 5.4 mm.; head 7.8 mm.; eye 1.4 mm.; snout 1.9 mm.; maxillary 3 mm.; interorbital space 1 mm.; snout to dorsal fin 5 mm.; snout to anal fin 15 mm.; height of dorsal fin 7 mm.; pectoral fin length 6.8 mm.; pelvic fin length 3.2 mm.; height of supraocular tentacle 2 mm.; dorsal fin, XIX, 12; anal fin, II, 21; pectoral fin 13; pelvic fin 3.

Description: Body elongate, considerably compressed posteriorly, the greatest width of body (across the swollen opercles) 6 in the length; depth 6.1.

Head 4.2 in the length; preopercular area and head considerably swollen. Upper profile of head a simple curve from nape to snout. A large flattened supraorbital tentacle, slightly longer than eye diameter. Preopercular margin not visible, hidden by the swollen sides of the head. Opercular margin smooth, the branchiostegal rays and membranes extending considerably beyond its margin, the tip of the outermost branchiostegal ray forming a slight forwardly-curved hook above; branchiostegal membranes broadly joined to each other but free from the isthmus.

Snout 4.1 in the head. Eye small, 5.6 in head, not entering the dorsal profile. Nostrils two on each side, the anterior with a small fleshy tentacle. Mouth small, the lips rather full; maxillary extending to posterior border of the eye. Teeth in the upper jaw strong, blunt and conical, the anterior ones strongest, in a single row, with a trace of asperities along the inner base of the anterior teeth resembling small teeth. Lower jaw with a similar series of teeth, the lateral anterior ones exceptionally strong and recurved. Vomerine teeth in a slightly curved row of four teeth. Palatine teeth similar in size and not quite continuous with the vomerine teeth.

Dorsal fin beginning on the nape, of 19 spines and 12 rays, the last ray connected by membrane with the caudal peduncle; a slight flap of membrane projecting forward from the edge of the 1st dorsal spine with the exception of the basal portion of the spine. Caudal fin rounded. Anal fin of 2 spines and 21 rays, similar to the dorsal but lower. Pectoral fins with lowermost five rays slightly thickened and with their tips free of membrane. Pelvic fins of three rays, short and thick, originating under the pectoral base.



Text-figure 4.

Emblemaria micropes. Drawing by George Swanson.

Color: The following notes were made upon the living fish. Head, supraocular tentacle, body and pectoral fins green, becoming more intense green on the caudal fin. Anterior three-quarters of the dorsal fin with alternate bands of green and bright red, each band including about two to three rays; posterior quarter of dorsal fin with faint pinkish patches distally in the webs. Anterior three-quarters of the anal fin green on its basal third, similar to that of the body, black on its median third and with the outer margin white; posterior quarter almost all green with only a hint of dusky and whitish.

Remarks: The five species of *Emblemaria* known from the eastern Pacific seem to be well differentiated from each other, not only by their coloration but by various combinations of other characters. In the following table the dorsal and anal fin counts and the head and pelvic fin proportions of the various species are gathered together.

Species.	Dorsal fin count.	Anal fin count.	Pelvic fin in length.	Head in length.
<i>nigra</i> , Panama	XXVII, 11	26-27	7.1-7.5	4.1-4.2
<i>nivipes</i> , Panama	XXIII-XXIV, 12-14	25	3.8	3.4-3.75
<i>hudsoni</i> , Peru	XXII-XXIII, 15-16	27	3.9	3.9
<i>oculocirrus</i> , Gulf of California	XXII, 13	25-26	4.9-5.75	3.75-4.1
<i>micropes</i> , Gulf of California	XIX, 12	23	10.3	4.2

This new species differs from the somewhat similar *Emblemaria oculocirrus* from the same region, in fin ray counts, smaller and differently shaped pelvic fins, low dorsal fin and in the supraocular tentacle. At first it was thought that the former was the opposite sex of the high-dorsalled *oculocirrus*, but careful dissection disclosed that all of the available specimens examined, four of *oculocirrus* and the type of *micropes*, were males. While perhaps of no importance, it is of interest that the specimen of

micropes was taken in weed along shore, while all three specimens of *oculocirrus* were washed out of empty augur shells taken on sandy shallows. For comparison with our materials of the genus we have examined the single specimen of *oculocirrus* taken by Dr. C. H. Townsend and recorded by Osburn and Nichols (*Bull. Amer. Mus. Nat. Hist.*, XXXV, (1916), p. 178).

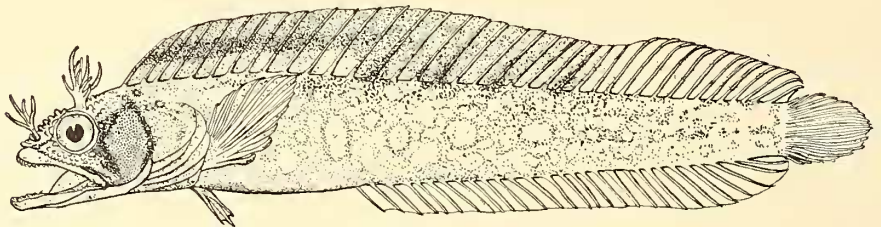
***Acanthemblemaria crockeri*, sp. nov.**

(Text-fig. 5).

Type: Holotype, No. 24,824, Department of Tropical Research, New York Zoological Society; taken with fulminating cap, 3½ fathoms deep, San Lucas Bay, Lower California, April 2, 1936; standard length 41 mm.; type in the collections of the Department of Tropical Research.

Dimensions of Type: Total length 46.2 mm.; standard length 41 mm.; depth 6.2 mm. (6.6 in length); head 10.2 mm. (4 in length); eye 2.1 mm. (4.85 in head); interorbital space 1.5 mm. (6.8 in head); snout 2.3 mm. (4.4 in head); maxillary 4.8 mm. (2.1 in head); predorsal length 6.5 mm. (6.3 in length); preanal length 18.2 mm. (2.2 in length); pectoral fin length 6.2 mm. (1.65 in head); pelvic fin length 3.4 mm. (3 in head); caudal peduncle depth 2.8 mm. (3.64 in head).

Counts of Type: Dorsal fin XXVI, 13; anal fin II, 27; pectoral fin 12; pelvic fin 3; caudal fin 19; branchiostegal rays 6.



Text-figure 5.

Acanthemblemaria crockeri. Drawing by Miss Eloise Southern.

Description: Body moderately elongate, the greatest depth at the base of the pelvic fins; the trunk compressed, especially posteriorly. The depth of the caudal peduncle 3.64 in the head length. Body scaleless. Anterior profile a simple curve from origin of dorsal fin to snout.

Head with short blunt spines anteriorly, those on the snout and at the anterior edge of the eye largest, the spines extending backward on the upper surface of the head slightly beyond the vertical of the posterior border of the orbit, the posterior margin of the spinous area forming a blunt angle at the mid-line of the body. Spines extending in a single palisade-like series about the orbit, except posteriorly where there is a slight elevated rim free of spines, and superiorly where there is a slight gap for the supraorbital tentacle; anterior orbital spines strongest. Interorbital space concave, its central portion free of spines. Supraorbital tentacle multifid, tree-like, with a number of major trunks and branches from which extend smaller ones, the height of one of the larger from its tip to the base of the tentacle, slightly greater than an eye diameter. Nasal tentacle of right side with a single-based bifid tentacle, that of the left side single-based but quadrifid distally, the tentacles about equal to an eye diameter in length. A group of pores extending slightly below and along posterior border of the eye; a series of 8 pores along the posterior border of the preopercle and on to the underside of the posterior portion of

the mandible; 3 pores, forming a triangle, at the nape immediately before the dorsal fin, and 4 pores on each side of the upper body above the preopercle and opercle. Branchiostegal membranes joined to each other but free from the isthmus, the rays extending upward beyond the opercular tip to form a small hook.

Dorsal fin beginning above the center of the preopercle, the tips of both rays and spines thickened; the fin connected by membrane to the caudal peduncle but not to the caudal fin. Anal fin originating under the 13th dorsal ray, similar to dorsal but its rays shorter and slightly heavier, the fin similarly joined to the caudal peduncle. Pectoral fin with tips of lower rays thickened. Pelvic fins originating before the pectoral, composed of 3 simple rays, the central ray longest, the inner ray shortest. Caudal fin rounded.

Teeth: Upper jaw with a single row of strong, conical, inwardly curved teeth, the teeth strongest anteriorly and much smaller along side of jaw; inside of this row anteriorly is a band of small conical teeth. Palatines with 2 rows of strong teeth. Vomer with about 5 strong teeth on each side.

Lower jaw expanded and flattened anteriorly, then constricted and expanded again posteriorly, the jaw, when viewed from above, shaped like an old-fashioned keyhole, or as suggested by Myers and Reid in their description of *Acanthemblemaria hancocki*, like the jaw of *Hippopotamus*. Lower jaw with a single series of flattened strong, conical teeth, paralleling which exteriorly, on the posterior half of the jaw, is a second row of somewhat similar teeth. Anteriorly behind the single strong series is a band of very small conical teeth.

Color: In life, general color of body brownish-tan, darker above; sides with small subcircular and oval spots of scarlet-red, these becoming dull brown superiorly. Head yellowish laterally and below, dull reddish-orange above and with a large oval patch of vinaceous-buff on the preopercle, this patch surrounded anteriorly, superiorly and posteriorly by a narrow blackish margin. Opercle with a small blackish patch near its posterior margin. Pectoral and pelvic fins with greenish-yellow rays. Vertical fins brownish-pink, the rays and spines pinkish. Caudal fin, rays of the dorsal fin and posterior rays of the anal with pinkish-red spots along the rays. Anterior portion of dorsal with a dull brown median band surmounted by a marginal orange band. Iris brownish-gold.

In preservative the scarlet and orange pigment has disappeared entirely and the specimen may be described as follows: General color pale buff, the entire body covered with minute brown chromatophores, the chromatophores on the sides and lower sides forming the borders of subcircular clear patches (These are the scarlet spots of the life coloration). Above, the chromatophores are more concentrated, forming irregularly-shaped patches which extend onto the base of the dorsal fin. Dorsal fin with brownish blotches, especially anteriorly where a spot of deep brown and black extends down the center of the fin. Anal fin with dark spots toward the outer margin, these especially marked anteriorly. Preopercle with a large ovoid brownish spot, heavily bordered anteriorly, superiorly and posteriorly with darker brown. Opercle mottled with brown.

Remarks: The genus *Acanthemblemaria* was previously represented in the eastern Pacific by the recently described *Acanthemblemaria hancocki* Myers and Reid 1936³, taken at Secas Island, Pacific coast of western Panama. The U. S. National Museum has kindly allowed us to have one of the paratypes of *hancocki* for examination. Comparison of the single specimen of *crockeri* with the original description of *hancocki* and the paratype of the latter has enabled us to draw up the following key to show the differences between the two species.

³ Myers, G. S. and Reid, E. D., *University of Southern California Publications, The Hancock Pacific Expeditions, Vol. 2, No. 2, pp. 7-9.*

KEY TO EASTERN PACIFIC SPECIES OF ACANTHEMBLEMARIA.

- A. Dorsal fin XXII to XXIII, 13 to 14; anal fin II, 24 to 25; spines of head relatively small and fine; supraorbital tentacle simple; head with a dark area like a large, hour-glass shaped saddle set transversely across the occiput and extending down on opercles to opposite lower rim of the eye; no oval, black-margined brown patch on the preopercle; body, in preservative, pale with conspicuous brown spots . . . *hancocki*.
- AA. Dorsal fin XXVI, 13; anal fin II, 27; spines of head coarse and heavy; supraorbital tentacle complex and multifid; no hour-glass shaped dark figure on nape; an oval conspicuous, black-margined brownish spot on preopercle; body, in preservative, with pale spots surrounded with darker *crockeri*.

EXPLANATION OF THE PLATES.

PLATE I.

- Fig. 1. *Mobula lucasana*. Dorsal view of freshly caught type specimen. Photograph by Toshio Asaeda.
- Fig. 2. *Mobula lucasana*. Ventral view of freshly caught type specimen. Photograph by Toshio Asaeda.

PLATE II.

- Fig. 3. *Mobula lucasana*. Under anterior surface of body showing folded cephalic fins, mouth and teeth. The upper jaw teeth show as a dark band just below the margin of the upper jaw. Photograph by Toshio Asaeda.
- Fig. 4. *Mobula lucasana*. View of posterior end of animal from dorsal side, showing the dorsal and pelvic fins and the expanded base of the tail. Photograph by E. Osterndorff.

PLATE III.

- Fig. 5. *Mobula lucasana*. Photograph of teeth of the lower jaw. Enlarged 33 times. Photograph by Mrs. Ruth Needham Nauss.

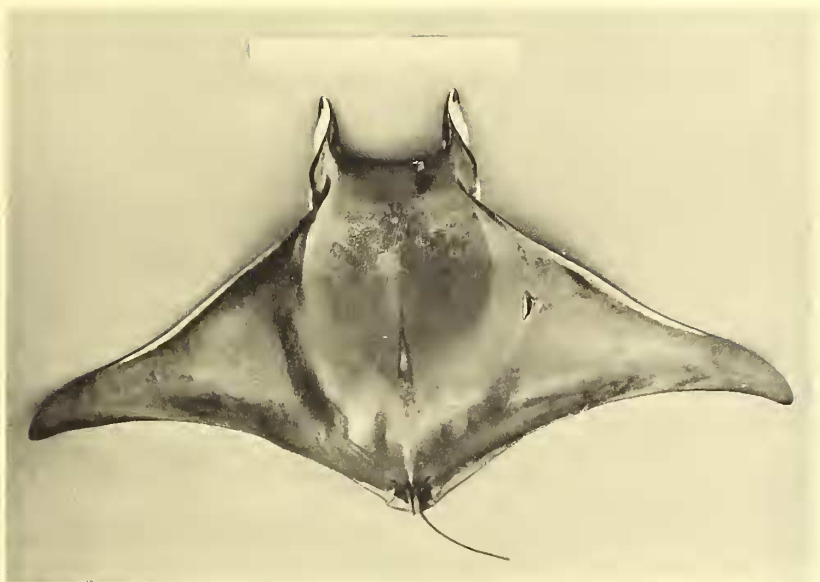


FIG. 1.



FIG. 2.

SEVEN NEW MARINE FISHES FROM LOWER CALIFORNIA.

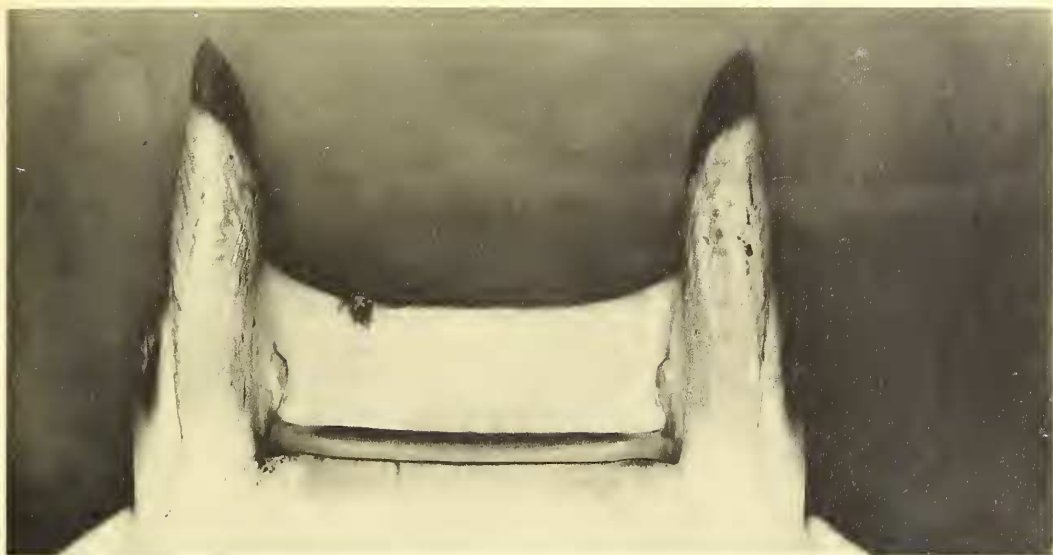


FIG. 3.

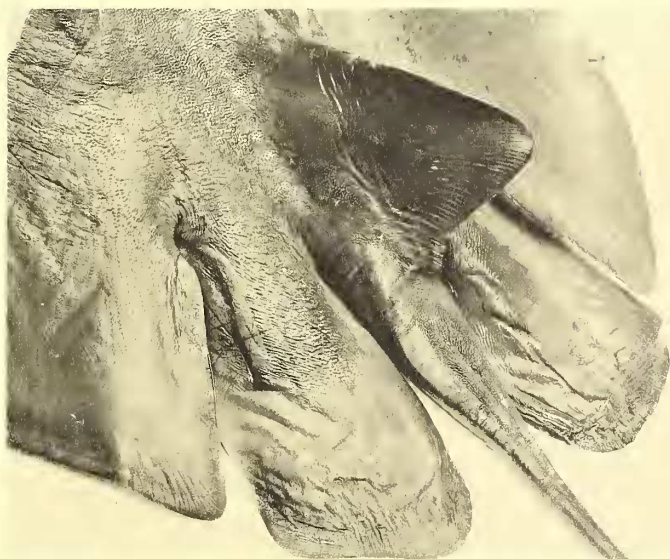


FIG. 4.

SEVEN NEW MARINE FISHES FROM LOWER CALIFORNIA.

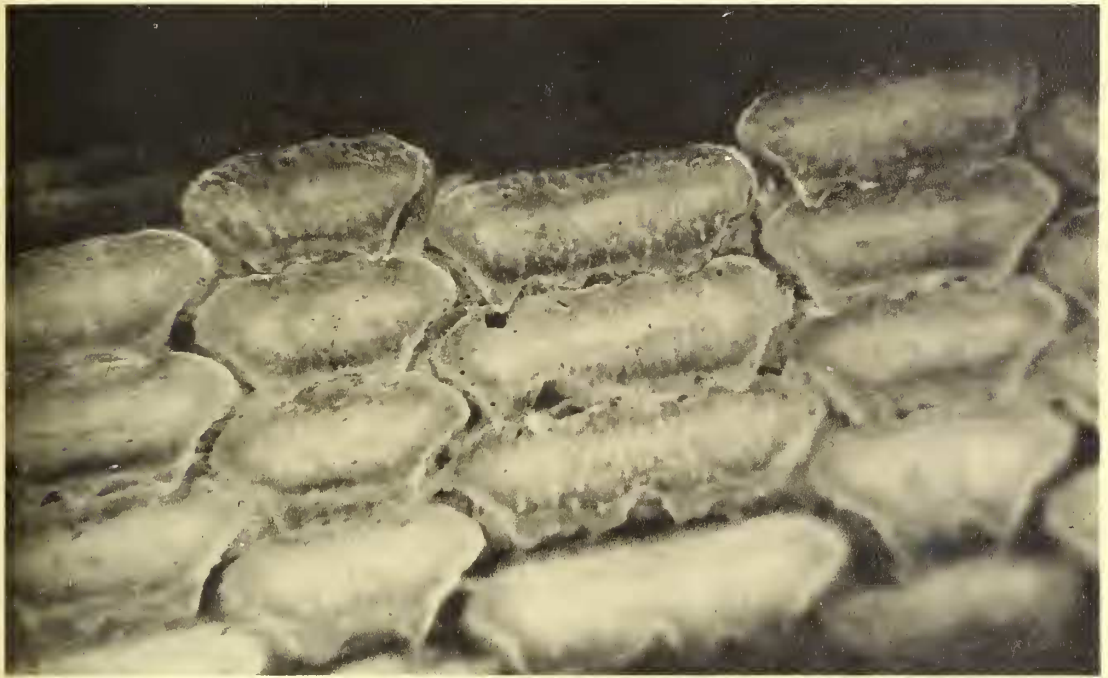


FIG. 5.

SEVEN NEW MARINE FISHES FROM LOWER CALIFORNIA.